1. POPOV, A. D.
2. USSR (600)
4. Cupola Furnaces
7. Main lining of the smelting zone and the cupola hearth, Lit. proizv. No. 2, 1953.

9. **Monthly List of Russian Accessions**, Library of Congress, June 1953. Unclassified.

POPOV, A.D., kandidat tekhnicheskikh nauk.

Continuous casting of pipes. Lit. proizv. no.8:7-8 Ag '56.
(MLRA 9:10)

(Pipe, Cast-iron)

L 22726-66 EWT(d)/EEC(k)-2

ACC NR: AF6002927 (A) SOURCE CODE: UR/0286/65/000/024/0088/0088

AUTHORS: Karminskiy, V. D.; Magnitskiy, Yu. A.; Popov, A. D.

22
B

ORG: none

TITLE: Device for measuring indicated power. Class 42, No. 177121

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 24, 1965, 88

TOPIC TAGS: power meter, wattmeter, piston engine

ABSTRACT: This Author Certificate presents a device for measuring indicated power in the cylinder of piston engines. The device contains a pressure transducer, an amplifier, a double-coil wattmeter, and a control resistance. To obtain the arithmetic mean value of the indicated power of a piston engine, two synchronous generators are connected in one of the coils of the wattmeter (see Fig. 1).

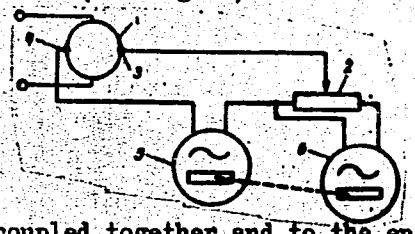

Fig. 1. 1 - wattmeter; 2 - control resistance; 3 and 4 - coil terminals of wattmeter; 5 and 6 - synchronous generators.

The shafts of the generators are rigidly coupled together and to the engine shaft. Orig. art. has: 1 diagram.

SUB CODE: 21/ SUBM DATE: 27May63

UDC: 531.781.08

Card 1/1 UDC:

POPOV, A.D.

Extremum regulator in the power circuit of a diesel locomotive. Sbor. st. RIIZHT no.45:5-14 '64.

Sparking indicator. Ibid.:65-69 (MIRA 19:1)

SKVARKOVSKIY, V.B.; GLEBOV, V.A., kand. tekhn. nauk, dotsent; ZHATKIN, G.F.; MIKHAYLICHENKO, N.G.; POPOV, A.D.; SIDOROV, Ye.A.; TSVETKOV, S.M.

Stand for testing miniature electrical machines in electric instrument systems. Sbor. st. RIIZHT no.45:58-64 '64. (MIRA 19:1)

POPOV, A.D.; MAZHDRAKOV, P.D.

Study of fat in animals in deep hibernation. Biokhimiia 29 no.4: 643-646 Jl-Ag '64. (MIRA 18:6)

1. Institut organicheskoy khimii Bolgarskoy AN, Sofiya.

POKAZAN'YEV, Aleksandr Arkad'yevich; POPOV, A.D., red.; PRIMAKOV, Ye.M., red.; NOVGORODOV, A.T., st. inzh., red.; SHAN'SHUROV, M.I., red.; GETLING, Yu., red.

['Law of the sea"; a documentary tale] "Morskoi zakon"; dokumental'naia povest'. Sverdlovsk, Sredne-Ural'skoe knizhnoe izd-vo, 1964. 56 p. (MIRA 18:3)

1. Sekretar' partiynogo komiteta Sredne-Ural'skogo medeplavil'nogo zavoda, Revda (for Popov). 2. Nachal'nik otdela truda i zarabotnoy platy Sredne-Ural'skogo medeplavil'nogo zavoda, Revda (for Shan'shurov).

IGNATOVA, T.S.; FLYAGIN, V.G.; POPOV, A.D.; CHUKREYEVA, Ye.I.; DIKSHTEYN, Ye.I.; NAZAROV, K.S.; MAKARYCHEV, A.R.

Manufacture and testing of highly resistant ladle firebrick. Ogneupory 29 no.11:489-495 '64. (MIRA 18:1)

1. Vostochnyy institut ogneuporov (for Ignatova, Flyagin, Popov, Chukreyeva). 2. Magnitogorskiy metallurgicheskiy kombinat (for Dikshteyn, Nazarov, Makarychev).

WRITE BELOW THIS LINE

POSTCARD

ACCESSION NR: AP4043941 S/0218/64/029/004/0643/0646

AUTHOR: Popov, A. D.; Mazhdrakov, P. D.

TITLE: Study of the fat of hibernating animals

SOURCE: Biokhimiya, v. 29, no. 4, 1964, 643-646

TOPIC TAGS: hibernation, fatty tissue, hedgehog, marmot, Citellus, Erinaceus

ABSTRACT: It was previously demonstrated that the fatty tissue of the marmot (Citellus citellus) maintains a liquid state even at temperatures of 5—6C and that, at temperatures of 15—20C, large quantities of hard glycerides are liberated. To determine whether this phenomenon is true for other hibernators, the authors examined a 900-g hedgehog (Erinaceus rumanicus). The animal was starved for two weeks prior to sacrificing. Fatty tissue was then removed from the spinal region (85g), and from the intestinal and kidney regions (26g). The fat was extracted by means of ether. It was found that the fat remained in a liquid state at temperatures of 5—6C. In this temperature range large quantities of glycerides were liberated

Card 1/2

POPOV, A. D. Military physician 1st grade

"Training of the Ear Vestibule Organs of Flying Purposes," Vest. vozd. flota, November, 1938

POPOV, A.D., inzh.; YEREMEYEV, Yu.A., inzh.

Experimental automated cold storage warehouse built with vibro-cast panels. Khol.tekh. 40 no.5:43-45 S-O '63. (MIRA 16:11)

1. Giprokholod.

POPOV, A.D.; POL', V.B.

New test for the determination of cast iron fluidity. Lit. proizv. no.7:39 Jl '62. (MIRA 16:2)
(Cast iron--Testing)

BLANK, E.M.; FILIPPOV, A.S.; POPOV, A.D.

Yttrium is a spheroidizer of graphite. Lit.proizv. no.11:38 N '62. (MIRA 15:12)

(Cast iron—Metallurgy) (Yttrium)

BLANK, E.M.; FILIPPOV, A.S.; POPOV, A.D.

New graphite spheroidizer. Fiz.met.i metalloved. 14 no.5:799-800 N '62. (MIRA 15:12)

1. Ural'skiy nauchno-issledovatel'skiy institut chernykh metallov.

(Cast iron—Metallography)

POPOV, A.D.

Design of exothermic risers on steel castings. Lit.proizv. no.3:40 Mr '62. (MIRA 15:3)

(Risers (Founding))

POPOV, Andrey Dmitriyevich; BUGROV, F.I., retsenzent; VOLPYANSKIY, L.M., inzh., red.; DUGINA, N.A., tekhn. red.

[Foundry practice and the design of foundries] Rabota liteinykh tsekhov i ikh proektirovanie. Pod red. L.M.Volpianskogo. Moskva, Mashgiz, 1962. 44 p. (Nauchno-populiarnaia biblioteka rabochego-liteishchika, no.32) (MIRA 15:7)

(Founding)

POPOV, Andrey Dmitriyevich; SOMINSKIY, Zel'man Abelevich; KHAKHALIN, Boris Dmitriyevich; EL'BERT, Semen Moiseyevich; FILIPPOV, A.S., kand. tekhn. nauk, retsenzent; DUGINA, N.A., tekhn. red.

[Continuous pouring of cast iron] Nepreryvnoe lit'e chuguna. Moskva, Mashgiz, 1961. 110 p. (MIRA 14:11)
(Continuous casting) (Cast iron)

POPOV, A-D.

PHASE I BOOK EXPLOITATION SOV/5458

Girshovich, Naum Grigor'yevich, Doctor of Technical Sciences, Professor, ed.

Spravochnik po chugunnomu lit'yu (Handbook on Iron Castings) 2d ed., rev. and enl. Moscow, Mashgiz, 1961. 800 p. Errata slip inserted. 16,000 copies printed.

Reviewer: P. P. Berg, Doctor of Technical Sciences, Professor; Ed.: I. A. Baranov, Engineer; Ed. of Publishing House: T. L. Leykina; Tech. Eds.: O. V. Speranskaya and P. S. Frumkin; Managing Ed. for Literature on Machine-Building Technology (Leningrad Department, Mashgiz): Ye. P. Naumov, Engineer.

PURPOSE: This handbook is intended for technical personnel at cast-iron foundries. It may also be of use to skilled workmen in foundries and students specializing in founding.

COVERAGE: The handbook contains information on basic problems in the modern manufacture of iron castings. The following are discussed: the composition and properties of the metal; the making of molds; special casting methods; the charge preparation; melting

Card 1/11

Handbook on Iron Castings SOV/5458

and modifying the cast iron; pouring, shaking out, and cleaning of castings; heat-treatment methods; and the inspection and rejection of castings. Information on foundry equipment and on the mechanization of castings production is also presented. The authors thank Professor P. P. Berg, Doctor of Technical Sciences, and staff members of the Mosstankolit Plant, headed by the chief metallurgist G. I. Kletskin, Candidate of Technical Sciences, for their assistance. References follow each chapter. There are 287 references, mostly Soviet.

TABLE OF CONTENTS:

Card ~~2/11~~

S/128/60/000/012/013/014
A054/A030

AUTHOR: Popov, A.D.

TITLE: Heat Calculations for Semi-Continuous Casting of Iron Pipes

PERIODICAL: Liteynoye proizvodstvo, 1960, No. 12, pp. 40 - 41

TEXT: Continuous casting is gaining ground in the production of pipes, mainly for water-conduits. The most vital part of the continuous casting equipment is the crystallizer, the heat characteristics of which are very important for the development of this method. The crystallizer is the intermittent conductor of heat from the cast metal and the drawn product to the cooling water. Heat transfer from the liquid metal to the cooling water takes place through a wall consisting of three layers: the hardening metal, the gas space formed and the crystallizer wall. In calculating the transfer of heat between two liquid media, developed in the first flat solid wall, the following formula can be used: $Q = k\Delta tF\tau$, where Q is the amount of heat developed or absorbed by the liquid flow in kcal; k the heat transfer coefficient in kcal/m^2 · h · degree; Δt the difference between the average temperature of the liquid flow transferring heat and that of the flow absorbing this heat; F the area in m^2; τ the time in hours.

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S/128/60/000/012/013/014
A054/A030

Heat Calculations for Semi-Continuous Casting of Iron Pipes

When calculating the temperature field for cast iron tubes with relatively thin walls, the formula of flat walls can be used instead of the intricate formula for cylindrical walls. The pipe wall is thin, when $\delta/r_1 < 1$, where r_1 is the inside pipe diameter and δ the pipewall thickness. The calculation error for pipes of a minimum diameter of 50 mm amounts to 3%, for pipes 150 mm in diameter to 0.1%. For a 150 mm diameter pipe with a heat transfer speed of 3 m/min from the pipe drawn to the crystallizer at a cooling water consumption of 16 m^3/h, an intake temperature of the water of 8°C and an outlet temperature of 26°C (i.e., $\Delta t = 26 - 8 = 18$°C), the heat quantity transferred from the pipe is: $Q = 18 \cdot 16 \cdot 1{,}000 = 288{,}000$ kcal/h. When the active surface of the crystallizer is F = 0.3 m^2, the specific heat flow amounts to $q = Q \cdot F = 960{,}000$ kcal/$m^2 \cdot h$ ($q = k\Delta t$ kcal/$m^2 \cdot h$). The value of Δt for the present numerical example is: $t_{aver} = 0.5 (8 + 26) = 17$°C. [Abstracter's note: subscript aver (average) has been substituted for subscript cp (sr) = srednyy.] Therefore, $\Delta t = 1{,}183$°C, thus 800 kcal/$m^2 \cdot h \cdot$ degree. The heat-resistance of the composite system is constituted by the total of the partial heat-resistances. It can be seen that the general heat transfer coefficient of the crystallizer is influenced by the gas-space forming between the hardening crust of metal and the crystallizer wall, the heat-resistance

Card 2/6

Heat Calculations for Semi-Continuous Casting of Iron Pipes

of which is 76°C. This space can be reduced by making the crystallizer cone--shaped and this is applied in continuous steel casting. However, even by this construction it is not possible to eliminate the thermal resistance of the cone entirely and the drawing speed cannot be increased by more than about 20%. However, the reversed cone-shape of the crystallizer cannot be applied in continuous iron casting, because iron (unlike steel and other metals) expands considerably before shrinking and this expansion overlaps shrinkage. The heat-resistance of the copper crystallizer wall is about 2.4%; steel is not much used for crystallizer, not only because the heat-resistance of steel walls is higher than of copper walls, but mainly because the blistering of steel walls hinders drawing. In the system of liquid iron-hardening crust-gas space-crystallizer wall-cooling water, the temperature distribution in the middle part of the crystallizer is calculated according to Figure 2. Based on the numerical values applied in the example and graph, the temperature drops occurring during the entire process are: between the liquid iron and the hardening crust 100°C, in the metal crust 85°C, in the space 927°C, in the crystallizer wall 28°C, between the wall and the water 84°C. In order to prevent blanching, continuous casting should be carried out without a secondary water cooling of the product removed from the crystallizer.

Card 3/6

Heat Calculations for Semi-Continuous Casting of Iron Pipes

It is, therefore, important that heat transfer be intensive in the crystallizer. 76°C of the heat transfer is due to the gas-space. On account of this it is desirable to intensify the contact of the hardening crust with the crystallizer wall to keep the crystallizer walls clean, not to use lubricating material producing sooty sediments, etc. The heat transfer between the liquid metal and the metal crust, moreover between the crystallizer and cooling water cannot be increased. The copper used for crystallizer walls must be clean, mainly arsenic-free. Even traces of this metal decrease the heat conductivity of the copper walls from 340 to 122 kcal/m · h · degree. Cooling intensity is affected much more by the speed of water flow than by the quantity of water. The water temperature has no great effect on the heat transfer, as its heat capacity changes but slightly with the increase in temperature. There are: 1 table and 2 figures.

S/128/60/000/012/013/014
A054/A030

Heat Calculations for Semi-Continuous Casting of Iron Pipes

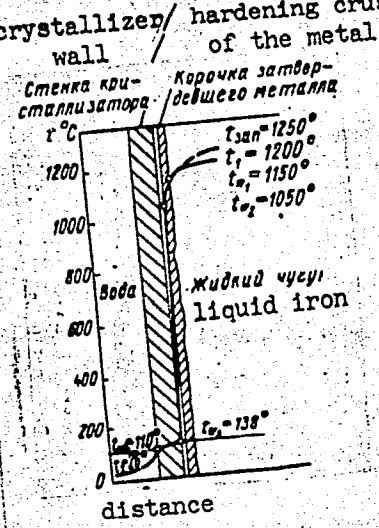

Figure 1: Distribution of heat in the middle zone of the crystallizer (in height). t_{pour} = 1,250° [Abstracter's note: subscript pour has been substituted for subscript зал (zalivka)].

Card 5/6

POPOV, A.D., kand.tekhn.nauk

Heat calculations in the semicontinuous founding of cast iron pipe. Lit. proizv. no. 12:40-41 D '60. (MIRA 13:12)
(Iron founding) (Pipe, Cast iron)

Popov, A.D.

PHASE I BOOK EXPLOITATION SOV/3482

Nauchno-tekhnicheskoye obshchestvo mashinostroitel'noy promyshlennosti. Sverdlovskoye otdeleniye

Mekhanizatsiya i avtomatizatsiya mashinostroitel'nogo proizvodstva (Mechanization and Automation in the Machine-Building Industry) [illegible], 1959. 519 p. 12,000 copies printed.

Ed.: Ye. V. Pal'mov, Doctor of Technical Sciences; Tech. Ed.: [illegible]; Editorial Board: P. P. Vakhrushev, Engineer, V. V. [illegible], Candidate of Technical Sciences, Ye. V. Pal'mov, Doctor of Technical Sciences, [illegible] Poruchikov, Candidate of Technical Sciences, V. V. [illegible], Candidate of Technical Sciences, K. N. Sokolov, Candidate of Technical Sciences, [illegible] Sokolovskiy, Candidate of Technical Sciences, M. I. [illegible], B. K. Semenyayev, Candidate of Technical Sciences, and P. V. [illegible], Professor.

PURPOSE: This book is intended for production engineers and personnel engaged in industrial planning.

COVERAGE: The material presented in this book is said to be based on practices developed and tested in the machine-building plants of the [illegible] of Siberia. Listed are various methods of mechanization and automation and their applications in foundries, forging shops, and assembly shops. Other fields of use include welding, hoisting, conveying, heat treatment, and quality control on an industrial scale. Various mechanisms, devices, tools, and instruments currently used in mechanization and automation of these industrial processes are described and illustrated. The equipment mentioned is said to have been produced by the plants using their own resources. The economic aspects of mechanization and automation are discussed. There are 494 Soviet references.

Card 6/15

POPOV, A.F.; ARKHANGEL'SKIY, Yu.V., red.; LARIONOV, G.Ye., tekhn. red.

[Nuclear reactor control systems for atomic power plants] Sistemy upravleniia i kontrolia iadernykh reaktorov atomnykh elektrostantsii. Moskva, Gos.energ.izd-vo, 1961. 215 p. (MIRA 14:12)
(Nuclear reactors) (Atomic power plants)

POPOV, A.F.

Level indicator for liquid metals. Priborostroenie no.7:14-16 Jl '62.
(MIRA 15:7)

(Liquid level indicators)

[illegible], A.F., [illegible], [illegible]YCHENKO, V.[illegible], insh.

Electric ship propulsion on alternating current. Sudostroenie
27 no.7:34-36 Jl '61. (MIRA 14:11)
(Ship propulsion, Electric)

ANTIPIN, L.M.; VISHNEVSKIY, L.D.; ZHIGACH, A.F.; POPOV, A.F.

Chemical activation of powdered aluminum by triisobutylaluminum.
Plast.massy no.1:73 '63. (MIRA 16:2)
(Aluminum)

LITVINENKO, L.M.; POPOV, A.F.

Kinetics of the reaction of diethylamine with aryl sulfochlorides in a benzene solution. Zhur.ob.khim. 33 no.4:1059-1069 Ap '63. (MIRA 16:5)

(Sulfonyl chlorides) (Diethylamine)

L 13613-63 EWG(k)/BDS/EWT(1)/EEC(b)-2/ES(w)-2 AFFTC/AFWL/ASD/ESD-3/SSD Pz-4/Pab-4/Pi-4/Po-4 IJP(C)/AT

ACCESSION NR: AP3004386 S/0109/63/008/008/1489/1490 81

AUTHOR: Demirkhanov, R. A.; Gevorkov, A. K.; Popov, A. F.; Khorasanov, G. L.

TITLE: On the use of a decaying plasma for detection of an shf signal

SOURCE: Radiotekhnika i elektronika, v. 8, no. 8, 1963, 1489-1490

TOPIC TAGS: shf signal demodulation, plasma pulse discharge, decaying plasma, plasma afterglow quenching, plasma decay

ABSTRACT: Some results of a study on the use of decaying plasma as an shf detector are presented. Experiments were carried out with plasma produced by a pulse discharge in helium for the case of a three-particle recombination, which was assumed to be the most probable process. The plasma was produced in glass tube (1) (see Fig. 1 of Enclosure), inserted in selenoid (4) by means of shf pulses of 1 to 3 sec from a magnetron. An shf probing signal from a sweep generator with a frequency deviation of 3200 to 3380 Mc was applied during the period between two magnetron pulses to cavity (2) for plasma firing. The quenching effect on an afterglow by the probing signal was recorded by means of a photoelectron multiplier, whose output pulse was applied to one channel of a dual-trace oscilloscope. The other channel of the oscilloscope was fed by a

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L 13813-63
ACCESSION NR: AP3004386

demodulated and amplified probing signal. The plasma density was determined by cavity detuning. The whole system was synchronized by a special circuit controlled by a master oscillator with a pulse repetition frequency of 60 cps. The discharge tube was filled by spectrally pure helium up to a pressure of 10^{-1} to 10^{-2} mm Hg. Fig. 2 represents a typical oscillogram of the glow intensity variations of a plasma at a wavelength of 3888 Å in the presence of the probing signal. The selected wavelength corresponds to the transition of an electron to the metastable helium level as a result of a triple collision: $He^+ + e^- + e^- \rightarrow He^* + e^-$. The oscillogram illustrates a case of cyclotron resonance. In a number of cases, a complete plasma light beam was recorded within the spectral sensitivity of a multiplier (see Fig. 2b). The minimum power of the probing signal which leads to marked quenching of afterglow (signal-to-noise ratio at the output of the multiplier, approximately 2) is approximately 10^{-8} to 5×10^{-7} w. Orig. art. has: 2 figures.

ASSOCIATION: none

SUBMITTED: 19Nov63 DATE ACQ: 20Aug63 ENCL: 02

SUB CODE: SD NO REF SOV: 001 OTHER: 005

Card 2/2

POPOV, A. F.

"Modern Balancing Machines and Their Theory."
Thesis for degree of Cand. Technical Sci.
Sub 18 Dec 50, Moscow Order of Lenin Aviation
Inst imeni Sergo Ordzhonikidze

Summary 71, 4 Sep 52, Dissertations Presented for Degrees in Science and Engineering in Moscow in 1950. From Vechernyaya Moskva, Jan-Dec 1950.

VERKHOVSKAYA, V.A.; DEYNEKO, V.F., prof.; ZYKOV, K.A.; KISLITSYN, A.S.; MURASHEV, S.A.; OBIRALOV, A.I.; PETRUSHINA, R.S.; POPOV, A.F.; RUMER, A.O.; SKOBELEV, A.T.; KHIZHINSKIY, D.G.; SHURYGINA, A.I., red. izd-va; ROMANOVA, V.V., tekhn. red.

[Laboratory work in aerophotogeodesy for land utilization faculties of higher agricultural schools]Laboratornye raboty po aerofotogeodezii; dlia zemleustroitel'nykh fakul'tetov sel'skokhoziaistvennykh vuzov. Pod obshchei red. V.F.Deineko. Moskva, Izd-vo geodez.lit-ry, 1962. 109 p. (MIRA 15:10)

1. Moscow. Institut inzhenerov zemleustroystva. 2. Kafedra aerofotogeodezii Moskovskogo instituta inzhenerov zemleustroystva (for all except Shurygina, Romanova).
(Aerial photogrammetry)

POPOV, A.F.

Effect of dwarf apple-tree stocks on the size of the leaf surface of grafted varieties. Nauch. dokl. vys. shkoly; biol. nauki no.2:174-177 '62. (MIRA 15:5)

1. Rekomendovana kafedroy plodovodstva Michurinskogo plodoovoshchnogo instituta.
(APPLE) (DWARF FRUIT TREES) (LEAVES)

KIBYAKOV, A.V., POPOV, A.F.

Some data on the mechanism of the appearance of muscular contracture of the anterior abdominal wall. Khirurgiia 34 no.7:57-62 Jl '58 (MIRA 11:9)

1. Iz kafedry normal'noy fiziologii Kazanskogo gosudarstvennogo meditsinskogo instituta.

(ABDOMINAL WALL, physiology
mechanism of appearance of musc. contracture (Rus))

ACCESSION NR: AP4037632 S/0096/64/000/006/0010/0015

AUTHOR: Popov, A. F. (Engineer)

TITLE: Control and monitoring system of the first AES (atomic power station)

SOURCE: Teploenergetika, no. 6, 1964, 10-15

TOPIC TAGS: reactor control, atomic power plant, atomic electric power plant, reactor shutdown, atomic reactor, power reactor, nuclear reactor, reactor power

ABSTRACT: The basic units of the system are described and some of their operating characteristics presented. 1) High reliability of the fuel tube monitor was achieved through development of improved measuring components. 2) Because no single instrument could provide correct readings of neutron flux changes (6 to 8 orders), power and reactivity margin are measured by several instruments, each covering 3-4 decades with overlapping of ranges. 3) Reactor power control is accomplished by (a) manual, remote control of 18 boron-steel shim rods (overall compensation about 15%), with provision for automatic insertion during emergency; and (b) an automatic system (2 control rods) which maintains power to within ± 1.5%. Power deviation is no more than ± 10%/sec when reactivity fluctuates ± 0.001; restoration time

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ACCESSION NR: AP4037632

does not exceed 5 sec. 4) To prevent explosion and contamination the safety system provides for automatic shutdown whenever certain parameters fluctuate critically. Overall compensation of the rods is 1.8%. 5) Power for the monitoring and control systems is supplied by independent sources with automatic cut-in of auxiliaries. D-c is obtained from batteries boost-charged by a 3-machine unit which operates as a generator when the primary source cuts out. Orig. art. has: 8 figures.

ASSOCIATION: none

SUBMITTED: 00 DATE ACQ: 09Jun64 ENCL: 00

SUB CODE: MP NO REF SOV: 004 OTHER: 002

Card 2/2

POPOV, A.F., kand.med.nauk

Practical treatment of burns. Kaz.med.zhur. 40 no.3:70-73 My-Je '59. (MIRA 12:11)

1. Iz kafedry gospital'noy khirurgii (zav. - prof.M.V.Sokolov) Kazanskogo meditsinskogo instituta.
(BURNS AND SCALDS)

POPOV, A.F., kand.meditsinskikh nauk

Case of torsion of the gall bladder. Kaz. med. zhur. no. 4:65-66 Jl-Ag '60. (MIRA 13:8)

1. Iz kliniki fakul'tetskoy khirurgii im. A.V. Vishnevskogo (zav. - prof. S.M. Alekseyev) Kazanskogo meditsinskogo instituta.
(GALL BLADDER—DISEASES)

POPOV, A.F., kand.med.nauk (Kazan')

Removal of gigantic ovarian cyst together with the uterus. Kaz. med. zhur. no.6:88 N-D '60. (MIRA 13:12)
(OVARIES--TUMORS) (UTERUS--SURGERY)

POPOV, A.F., inzh.

Regulation and control systems of the first atomic power plant. Teploenergetika 11 no.6:10-15 Je '64. (MIRA 18:7)

ANTIPIN, L.M.; ZHIGACH, A.F.; LARIKOV, Ye.I.; POPOV, A.F.

Investigating the direct synthesis of triisobutylaluminum. Khim.prom. 41 no.4:14-15 Ap '65. (MIRA 18:8)

KORNEYEV, N.N.; POPOV, A.F.; ZHIGACH, A.F.; VOLKOV, G.I.

Reaction of ethyl aluminum sesquichloride with sodium. Plast.massy no.6[illegible]-30 '65. (MIRA 18:9)

S/064/61/000/004/002/003
B110/B207

AUTHORS: Zhigach, A. F., Popov, A. F., Vishnevskiy, L. D., Korneyev, N. N.

TITLE: Direct triethyl aluminum synthesis

PERIODICAL: Khimicheskaya promyshlennost', no. 4, 1961, 27-31

TEXT: According to technical and commercial calculations, the direct synthesis: $Al + 1.5\ H_2 + 3\ C_2H_4 \longrightarrow Al(C_2H_5)_3$ was found to be most suitable among all triethyl aluminum syntheses (TEA). The present paper lists the results of studies on the direct synthesis and a two-stage procedure with comparatively low temperatures and pressures. After drying, hydrogen, ethylene, and nitrogen contained 0.004-0.007 g/m^3 moisture, 0.001-0.045% oxygen. Gasoline of the "Калоша" (Kalosha) (ГОСТ 443-56) (GOST 443-56) type was dried with Na. Aluminum powder ПАК-3 (PAK-3) (ГОСТ 5194-50)(GOST 5194-50), activated by means of 50-60 hr grinding on the vibration mills constructed by VNIINSM, proved to be best suited. Per 1 part Al, 2.5-3 parts gasoline, containing 5% TEA were used to

prepare the suspension. First, the reaction conditions were investigated at low pressure (20-30 atm), then the effect of technological factors upon aluminum conversion and output. A 1.2 l autoclave was charged with 50-80 g of a 10-20 g Al containing aluminum-gasoline suspension and 400 g of a 150-200 g TEA containing gasoline solution. Subsequently, hydrogen was introduced and stirred until hydrogen absorption was finished, cooled to room temperature and, at 70-75°C, ethylene was introduced until ethylene absorption was terminated. Up to 91.5% aluminum was obtained with titanium hydride, containing 3% hydrogen ($TiH_{1.55}$), at a 30-atm hydrogen pressure and 110°C. The aluminum increased from 33.7% to 91.5% with increasing TiH concentration from 0.55 to 3.34%, the output of reaction mass per hour from 4.4 to 14.7 g/kg. Table 2 shows the effect of the TEA:Al ratio. Table 3 shows the effect of the hydrogen pressure upon TEA formation, Table 4 the effect of temperature upon hydrogenation. By increasing the number of revolutions of the stirrer from 300 rpm to 2800 rpm, it was possible to increase the Al output from 30-40% to 81-98%. Table 5 shows the reaction of diethyl aluminum hydride (DEAH) as a function of ethylene pressure. A 95% output could be obtained within

0.75 hr at 20 atm. Only the direct TEA synthesis was performed in the 18 l autoclave with shielded stirring mechanism (Fig.). Aluminum powder was filled into the mixer 2 into which also "Kalosha" gasoline from measuring vessel 1 was introduced. After thorough stirring, the gasoline-aluminum suspension was introduced into vibratory mill 3 together with the concentrated TEA solution from measuring vessel 11. After grinding for 50-60 hr, the suspension entered the collector 4. Then, via measuring vessel 5, it was conducted to reaction vessel 6 into which concentrated TEA solution was introduced from measuring vessel 11. The product was hydrogenated at 110-115°C and 15-25 atm hydrogen pressure, ethylated at 75-80°C and 3-10 atm. The reaction products directed into the collecting vessel 7, were passed into centrifuge 8 to separate fine-disperse aluminum. The purified TEA solution was passed into the measuring vessel 11, via the collecting vessel 10. A higher aluminum percentage (80-98%) than with the laboratory apparatus was obtained, which is due to additional aluminum activation caused by intensive stirring. The following quantities in kg were consumed per 1 kg TEA: aluminum, in practice: 0.27, theoretically: 0.236; ethylene in practice: 0.805, theoretically:

Direct triethyl aluminum synthesis

S/064/61/000/004/002/003
B110/B207

0.740; hydrogen, in practice: 0.027, theoretically: 0.024. There are 1 figure, 6 tables, and 19 references: 4 Soviet-bloc and 15 non-Soviet-bloc. The reference to the English-language publication reads as follows: Ref. 13: H. E. Redman, US Patent 2787626, 1957.

Card 4/12

LARIKOV, Ye. I.; ZHIGACH, A. F.; POPOV, A. F.; KULIKOVSKAYA, T. N.; VLADYTSKAYA, N. V.

Thermal decomposition of aluminum alkyls. Khim prom no. 3: 171-174 Mr '64. (MIRA 17:5)

ZHIGACH, A.F.; POPOV, A.F.; VISHNEVSKIY, L.D.; KORNEYEV, N.N.

Direct synthesis of triethylaluminum. Khim.prom. no.4:249-253 Ap '61. (MIRA 14:4)

(Aluminum)

33440
S/064/62/000/001/003/008
B110/B138

11.2223 also 2209
11.1250

AUTHORS: Zhigach, A. F., Popov, A. F., Vishnevskiy, L. D., Antipin, L. M.

TITLE: Direct synthesis of triisobutyl aluminum

PERIODICAL: Khimicheskaya promyshlennost', no. 1, 1962, 24 - 26

TEXT: Triisobutyl aluminum (I) was directly synthesized according to

$$Al + 2Al(i\text{-}C_4H_9)_3 + 1^1/_2H_2 \rightarrow 3AlH(i\text{-}C_4H_9)_2$$
$$3AlH(i\text{-}C_4H_9)_2 + 3CH_2{=}CH(CH_3)_2 \rightarrow 3Al(i\text{-}C_4H_9)_3$$
$$\overline{Al + 1^1/_2H_2 + 3CH_2{=}CH(CH_3)_2 \rightarrow Al(i\text{-}C_4H_9)_3}$$

As isobutylene hardly reacts with I, the reaction can take place in one stage. It has been achieved by L. I. Zakharkin, O. Yu. Okhlubystin and V. V. Gavrilenko (Ref. 4: Izv. AN SSSR, OKhN, 100, (1957)) at 130 - 140°C and 150 atm with almost quantitative Al conversion and by other investigators at various temperatures and with lower yield. The authors studied the effect of pressure and temperature on Al conversion, output,

Card 1/3

and optimum reaction conditions. They used Al powder type PAK-3 (PAK-3) (GOST 5194-50 (GOST 5194-50)) ground for 50 hrs in an M-10 (M-10) vibratory mill, isobutylene (II) (0.001% by weight of aldehyde, 0.045% by weight of isobutyl alcohol), and rubber solvent spirit (GOST 443-56 (GOST 443-56). An Al solvent spirit suspension, I, and II were synthesized in a rotating (2 rpm) 2.5-liter autoclave at 80 - 165°C with H_2 passing through, until the pressure ceased to drop. Al conversion increased with the temperature. At low temperatures, the synthesis took 1.5 - 3.5 hrs with Al conversion <50%. Al conversion increased from 33.2 to 71.0% with H_2 pressure rising from 31 to 60 atm, reaction time decreased from 10 - 3.3 hrs, and the output increased from 7.4 to 78.3 g/kg·hr. Further pressure increase caused no more changes; so 50 - 60 atm is taken as the optimum. 0.41 - 0.57 kg of finely dispersed, active, ground Al in the solvent, 0.35 - 0.36 kg of I dissolved in 1 - 2 kg of solvent, and 3 - 4 kg of II were put into autoclave 3 and stirred under an H_2 pressure of 40 - 60 atm at 140 - 150°C. Maximum H_2 absorption (4 liter/min) was observed after 1 hr. After absorption, residual H_2 and II were passed through 4, and II was condensed.

Direct synthesis of triisobutyl...

The reaction mass was passed into centrifuge 6 via 5. Average Al conversion was 81.9%, and the consumption of raw material somewhat exceeded stoichiometric amounts. There are 2 figures, 3 tables, and 9 references: 5 Soviet-bloc and 4 non-Soviet-bloc.

Fig. 1. Flow sheet for triisobutyl aluminum production.
Legend: (1) vibratory mill; (2) and (5) portable vessels; (3) reaction vessel; (4) cooler; (6) centrifuge; (7) collector for triisobutyl aluminum solution; (a) nitrogen; (b) aluminum; (c) benzine; (d) hydrogen; (e) heat-transferring medium; (f) isobutylene; (g) ammonia; (h) slime; (i) isobutylene solution; (k) isobutylene.

Card 3/3

POPOV, A.F.; LARIKOV, Ye.I.; KULIKOVSKAYA, T.N.

Solubility of isobutylene in triisobutylaluminum. (MIRA 15:9)
Khim.prom. no.9:561-562 Ag '62.
(Aluminum) (Pentanone)

KORNEYEV, N.N.; POPOV, A.F.; ZHIGACH, A.F.

Activation of aluminum for the direct synthesis of triethylaluminum. (MIRA 15:11)
Khim.prom. no.9:645-656 S '62.
(Aluminum)

ZHIGACH, A.F., doktor khimicheskikh nauk; POPOV, A.F., kand.tekhn.nauk; BEZUKH, Ye.P.

Continuous synthesis of triethyl-aluminum sesquichloride. Biul.tekh.-ekon.inform.Gos.nauch.i tekh.inform. no.11:39-41 '62. (MIRA 15:11)
(Aluminum, Triethyl)

S/191/63/000/001/016/017
B117/B180

AUTHORS: Antipin, L. M., Vishnevskiy, L. D., Zhigach, A. F., Popov, A. F.

TITLE: Chemical activation of aluminum powder by triisobutyl aluminum

PERIODICAL: Plasticheskiye massy, no. 1, 1963, 73

TEXT: The effect of activation conditions on the conversion of ПАК-3 (PAK-3) aluminum powder was studied, as also on the productivity of the direct synthesis of triisobutyl aluminum (TIBA). The test conditions were: Al:TIBA 0.45-0.48; activation at 30-40 atm for 3 hrs; synthesis at 150-160°C and 120-80 atm until complete conversion of the aluminum. Maximum productivity of the synthesis was reached at 195°C, the yield decreasing with a further temperature rise up to 230°C. The synthesis is improved by longer activation. The synthesis time depends on the Al:TIBA ratio. Optimum activation conditions are: 160-195°C, 10 hrs, 30 atm, in which case, the synthesis can be carried out at reduced pressure (60-45 atm). The method is simple and requires no special apparatus and can be used to produce reactive aluminum industrially.

Card 1/1

S/064/63/000/002/002/005
B117/B186

AUTHORS: Antipin, L. M., Zhigach, A. F., Larikov, Ye. I., Popov, A. F.

TITLE: Study of the direct one-stage synthesis of triisobutyl aluminum

PERIODICAL: Khimicheskaya promyshlennost', no. 2, 1963, 17 - 20

TEXT: A study was made of how aluminum conversion during the one-stage synthesis of triisobutylaluminum (TIBA) depends on the preceding activation of aluminum as well as on the temperature and duration of the process. The following Al powders were used: ПАК-3 (PAK-3) activated by TIBA, the mechanically and chemically activated ПА-4 (PA-4) and non-activated powder obtained by granulation in the inert-gas current. The experiments were made at 50 - 60 atm in a hermetically sealed autoclave with a shielded drive for the mixer. The device has been described earlier (A. F. Zhigach, A. F. Popov, L. D. Vishnevskiy, L. M. Antipin, Khim. prom. no. 1, 24 (1962)). The kinetic curves obtained show that when mechanically activated aluminum is used hydration sets in after an induction period during which the inhibiting admixtures are removed from the Al surface. The activated Al enters the reaction without inhibiting oxide layer. The reaction rate is

Card 1/3

very high and the dependence of the aluminum conversion on the duration of the process is almost linear like the curves of hydrogen consumption. The further S-shaped course of the curves is characteristic of successive reactions. The total rate of the process decreases as a result of the decreasing rate of hydration. With chemically activated aluminum the synthesis sets in spontaneously, but it proceeds more slowly. This is probably due to a partial removal of the inhibiting oxide layer during the activation of Al. If the powder granulated in the inert gas current is used the synthesis is preceded by an induction period. The duration of this depends on the temperature of the process, being 3 hr at 110°C and 0.5 hr at 150°C. A comparison of the linear sections of the kinetic curves obtained showed that the amount of aluminum conversion in the initial state of the synthesis ($\sim$3 hr) can be used as criterion for estimating the reactive power of Al. Aluminum conversion depends on the synthesis temperature. At higher temperatures (150°C), its effectiveness is about 1.5 to 2 times higher than at 110°C. When mechanically and chemically activated aluminum is used the rate of the synthesis is determined by processes of mass transfer. The reaction proceeds in the diffusion range. The activation energy is 3.6 to 5.7 kcal/mole. In the case of the powder granulated in inert gas the rate of the synthesis is determined by one of the stages of direct synthesis.
Card 2/3

Study of the direct...

S/064/63/000/002/002/005
B117/B186

The activation energy attains 14.5 kcal/mol. There are 7 figures and 1 table.

Card 3/3

L 22650-65 EWT(m)/EPF(c)/EWP(j)/T Pc-4/Pr-4/Pi-4 RM/MLK

ACCESSION NR: AT5002129 S/0000/64/000/000/0168/0169

B+1

AUTHOR: Mikheyev, Ye. P.; Popov, A. F.; Filimonova, N. P.

TITLE: Photochlorination of methylchlorosilanes in the liquid phase with preferential formation of monochloroderivatives

SOURCE: AN SSSR. Institut neftekhimicheskogo sinteza. Sintez i svoystva monomerov (The synthesis and properties of monomers). Moscow, Izd-vo Nauka, 1964, 168-169

TOPIC TAGS: chlorosilane, silicoorganic compound, photochlorination, continuous chlorination

ABSTRACT: The photochlorination of liquid methyltrichloro-, dimethyldichloro-, and trimethylchlorosilanes was studied under laboratory conditions to optimize both the yield of monochloroderivatives and safety factors. The continuous chlorination apparatus consisted of a quartz reactor with a PRK-8 mercury vapor lamp and a distillation column with an efficiency of 12 theoretical plates to remove oxygen from the feed and to separate the products from nonreacted methylchlorosilanes. The latter were recirculated, and the products separated on a second column with a separation efficiency of 15 theoretical plates. The yield of monochloroderivatives was 70-94%. Orig. art. has: 1 table.

Card 1/2

L 22650-65

ACCESSION NR: AT5002129

ASSOCIATION: None

SUBMITTED: 30Jul64 ENCL: 00 SUB CODE: OC,GC

NO REF SOV: 003 OTHER: 001

Card 2/2

ANTIPIN, L.M.; ZHIGACH, A.F.; LARIKOV, Ye.I., POPOV, A.F.

Direct single-stage synthesis of triisobutylaluminum. Khim. prom. no.2:97-100 F '63. (MIRA 16:7)

(Aluminum organic compounds)

KORNEYEV, N. N.; POPOV, A. F.; ZHIGACH, A. F.; VOLKOV, G. I.

Synthesis of diethyl aluminum chloride via triethyl aluminum sesquichloride. Khim. prom. no.3:178-180 Mr '63.
(MIRA 16:4)

(Aluminum compounds) (Aluminum chloride)

SAKHAROVSKAYA, G.B.; KORNEYEV, N.N.; POPOV, A.F.; LARIKOV, Ye.I.; ZHIGACH, A.F.

Reaction of trialkylaluminum with water. Zhur. ob. khim. 34 no.10: 3435-3438 O '64. (MIRA 17:11)

L 31119-65 EWT(m)/EPF(c)/EPR/EWP(j)/EWA(c) Pc-4/Pr-4/Ps-4 RPL RM/WW

ACCESSION NR: AP5007158 S/0285/65/000/003/0025/0025

34
B

AUTHOR: Zhigach, A. F.; Popov, A. F.; Kuznetsov, N. I.; Vladytskaya, N. V.; Antipin, L. M.; Vishnevskiy, L. D.

TITLE: A method for producing higher aluminum organic compounds. Class 12, No. 167869

15

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 3, 1965, 25

TOPIC TAGS: metalorganic compound, aluminum organic compound

ABSTRACT: This Author's Certificate introduces a method for producing higher aluminum organic compounds by superalkylation of triisobutyl aluminum. In order to simplify the process, isobutylene is polymerized in the presence of diisobutyl aluminum chloride.

ASSOCIATION: none

SUBMITTED: 03Dec63 ENCL: 00 SUB CODE: GC, OC

NO REF SOV: 000 OTHER: 000

Card 1/1

POPOV, A.F. (Michurinsk)

Fruit bearing of a dwarf apple tree. Priroda 52 no.3:119-120 '63.
(MIRA 16:4)

(Apple) (Dwarf fruit trees)

POPOV, A.F.

Examining electromechanical balancing machines. Trudy Sem.teor.mash. 12 no.46:46-71 '52. (MLRA 6:6)

(Balancing of machinery)

SOV/124-58-5-5015

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 5, p 11 (USSR)

AUTHOR: Popov, A.F.

TITLE: Investigating the Period of the Steady-state Motion of Machines (Issledovaniye perioda ustanovivshegosya dvizheniya mashin)

PERIODICAL: Nekotoryye vopr. dinamiki mashin. L'vov, un-t, 1956, pp 119-133

ABSTRACT: It is assumed that a mechanism is engaged in a steady-state motion, the mean angular velocity of its driving link being ω_m; instantaneous values are given for the moment M and for the reduced moment of inertia I as functions of the angle ϕ characterizing the position of the mechanism. Assuming the angular velocity of the mechanism to be greatly nonuniform, the author seeks the instantaneous angular velocity $\omega = \omega(\phi)$ and the instantaneous angular acceleration $\varepsilon = \varepsilon(\phi)$. Since the kinetic energy of the mechanism equals

$$T = \int_{\phi_0}^{\phi} M \, d\phi + T_0$$

Card 1/2

Investigating the Period of the Steady-state Motion of Machines

the problem reduces to determining what initial value of the kinetic energy T_o corresponding to the angle $\phi = \phi_o$ would have yielded an angular velocity that would equal the given mean value ω_m. This value of T_o is determined graphically. This method of investigation, however, is rather laborious.

M.Ya. Kushul'

1. Machines--Motion 2. Dynamics 3. Mathematics--Applications

Card 2/2

SOV/124-58-4-3745

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 4, p 12 (USSR)

AUTHOR: Popov, A. F.

TITLE: Fundamentals of the Theory of Link Arrangements in Kinematic Chains and Their Application to the Determination of the Degree of Freedom of Motion (Osnovy teorii konturnogo stroyeniya kinematicheskikh tsepey i ikh prilozheniye k opredeleniyu stepeni podvizhnosti)

PERIODICAL: Nauchn. zap. L'vovsk. politekhn. in-ta, 1956, Nr 43, pp 158-166

ABSTRACT: Existing methods of structural analysis of complex mechanisms belonging to various types are expanded. The article describes methods for determination of the type to which various mechanisms belong.

1. Mechanical drives--Theory

V. A. Zinov'yev

Card 1/1

L 51876-65 EWT(m)/EPF(c)/EPR/EWP(j)/T/EWA(c) Pc-4/Pz-4/Ps-4 RPL WW/RM

ACCESSION NR: AP5010548 UR/0064/65/000/004/0014/0015

661.786.21:547.356.2'313.4-125':66.091

AUTHORS: Antipin, L. M.; Zhigach, A. F.; Lerikov, Ye. I.; Popov, A. F. 34 B

TITLE: Direct synthesis of triisobutylaluminum

SOURCE: Khimicheskaya promyshlennost', no. 4, 1965, 14-15

TOPIC TAGS: organo metallic compound, hydration, alkylation, organic synthesis

ABSTRACT: The conversion of aluminum in triisobutylaluminum is complex, slowing down after 2-3 hours treatment because of oxide coating. This conversion of aluminum activated by different methods was examined. No induction period, characteristic of single-stage synthesis, was observed in any of the experiments. The rate of hydration increased with rise in temperature. At 150C the aluminum had reacted completely in 3-5 hours. Further heating at that temperature led to decline in content of aluminum bound in the reaction products and to an increase of aluminum in isobutane. This is due to thermal decomposition of diisobutylaluminum hydride. Such decomposition may be suppressed by adding isobutylene to the reacting mass. Experiments show that the conversion of aluminum in diisobutylaluminum hydride takes place much more rapidly than the single-stage synthesis

Card 1/2

L 51876-65

ACCESSION NR: AP5010548

of triisobutylaluminum. Industrially, then, triisobutylaluminum should be synthesized in two stages or, if in one stage, in a cascade of reactors. When the latter technique is employed, an excess of diisobutylaluminum hydride should be maintained in the first reactor, and an excess of isobutylene should be maintained in the last. Orig. art. has: 2 figures.

ASSOCIATION: none

SUBMITTED: 00 ENCL: 00 SUB CODE: GC, OC

NO REF SOV: 001 OTHER: 001

Card 2/2

L 65100-65 EWP(e)/EWT(m)/EWP(t)/EWP(k)/EWP(a)/EWP(b) IJP(c) JD
ACCESSION NR: AP5021971 UR/0286/65/000/014/0023/0023
669.71 : 547.419.6

AUTHOR: Zhigach, A. F.; Popov, A. F.; Silvestrov, D. N.; Aronov, M. I.; Larikov, Ye. I.; Antipin, L. M.; Nazarov, S. Ye.; Korneyev, N. N.

TITLE: A method for activating aluminum. Class 12, No. 172780

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 14, 1965, 23

TOPIC TAGS: aluminum, powder metal production, powder metallurgy, aluminum powder

ABSTRACT: This Author's Certificate introduces a method for activating aluminum by pulverizing it in a cavitation mill with a shielded electric drive. The method is simplified by grinding the aluminum for ~10 hours until the particle size is 0.5-1 μ.

ASSOCIATION: none

SUBMITTED: 02Feb62 ENCL: 00 SUB CODE: MM

NO REF SOV: 000 OTHER: 000

Card 1/1

LITVINENKO, L.M.; POPOV, A.F.

Nature of interaction between aryl sulfochlorides and primary alkylamines in a benzene solution. Dokl. AN SSSR 160 no.5:1124-1127 F '65. (MIRA 18:2)

1. Khar'kovskiy gosudarstvennyy universitet. Submitted August 19, 1964.

POPOV, A.F.

Electric hygrometer for measuring minor humidities.
Priborostroenie no.5:12-14 My '63. (MIRA 16:8)

POPOV, A. F.

7491. POPOV, A. F. Matematicheskiy analiz izobrazheniya na aerosnimke. (Gorki), 1954. 56 s. s. chert. 25sm. (m-vo vyssh. obrazovaniya SSSR. belorus. ordena trud. krasnogo znameni s.-kh. akad.) 1.500 EKZ. 4r - (55-4275)p 526. 918

So. Knizhnaya Letopis', Vol. 7, 1955

POPOV, A.F.

Distribution of zeros in the quotients of sums of Dirichlet series. Izv. vys. ucheb. zav.; mat. no.4:93-98 '61. (MIRA 14:7)

1. Shakhtinskiy pedagogicheskiy institut.
(Series, Dirichlet's)

POPOV, A.F., kand. med. nauk

Unresolved problems in chronic appendicitis. Kaz. med. zhur. no.5:49-51 S-O'63 (MIRA 16:12)

1. Kafedra gospital'noy khirurgii (zav. - prof. N.V.Sokolov) Kazanskogo meditsinskogo instituta.

9.3150,24.2120

77842
SOV/57-30-3-8/15

AUTHORS: Demirkhanov, R. A., Gevorkov, A. K., Popov, A. F., Zverev, G. I.

TITLE: High-Frequency Oscillations in a Restricted Plasma (Work Completed in 1958)

PERIODICAL: Zhurnal tekhnicheskoy fiziki, 1960, Vol 30, Nr 3, pp 306-314 (USSR)

ABSTRACT: Oscillations observed in discharges are identified usually as plasma oscillations. However, Looney and Brown (see reference) observed some oscillations which occur only in presence of double layers on plasma boundaries. This is not in agreement with the theory of plasma oscillations. The authors here investigate the nature and excitation mechanism in plasma bounded by double layers and show that one obtains high-frequency oscillations due to oscillatory motion of secondary electrons in the potential well of the plasma. They used an apparatus similar to that of Looney and Brown (see Fig. 1).

Card 1 /7

High-Frequency Oscillations in a Restricted Plasma

77842
SOV/57-30-3-8/15

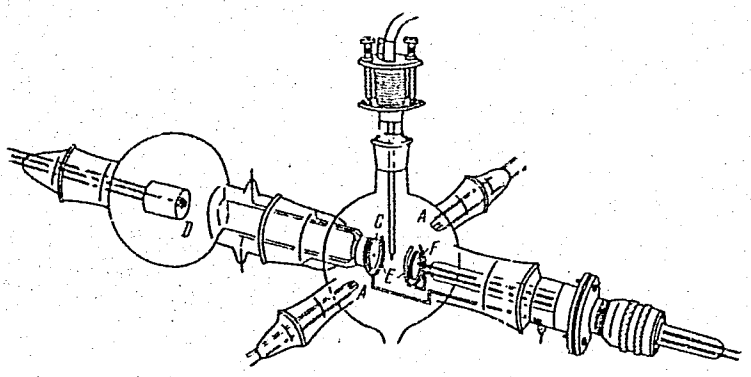

Fig. 1. Construction of discharge tube.

Plasma was produced between the oxide-coated cathodes A and anodes E. Electron beam, up to 3 kv of energy entered the region through C, and after crossing a distance L through the plasma, it would fall on F,

Card 2/7

connected electrically to C. The potential well for electrons was caused by ion layers between annular anodes E and electrodes F and C. Variable voltage 0-400 v enabled large variations of ion layer thickness. Distance L between F and C could be changed 10-30 mm. Working pressure was 10^{-2}-10^{-3} mm Hg, while the gases used were Ar, H_2, and N_2. A movable coaxial probe was collecting plasma parameters and oscillation frequencies, with the sensitivity of the registering device at 10^{-11} v. The authors first derive an expression for the frequency inside the potential well f_0 of electrons caused by secondary emission of electrons by primary beam on F:

$$f_0 = \frac{1}{4\frac{d}{v} + \frac{2(L-2d)}{\sqrt{\frac{2eV_1}{m}}}}$$

where d is thickness of ionic layer; $\bar{v}$ is average velocity of electrons in layer; V_1 is potential of plasma with respect to source of electrons. They found that these secondary electrons oscillating inside the potential well are responsible for the excitation of oscillations measured by the probe and listed in Table 1. Note that observed frequencies satisfy relation

$$f_n = nf_0 \quad (n = 1, 2, 3 \ldots).$$

Similar results were obtained for fixed potentials and variable L. A continuous flow of electrons oscillating inside the well could not produce an amplification of alternating fields unless a mechanism exists ensuring an orderly motion and enabling particles to give their energy to the alternating field. The authors show that such a mechanism of amplitude selection can exist provided there is an alternating field on the boundary of the plasma in addition to the constant field.

Table 1. V_{beam} = 300 v; P = $7 \cdot 10^{-3}$ mm Hg; L = 20 mm; f_o is frequency computed from the potential distribution; $f_n = nf_o$ (n = 1, 2, 3...) are experimentally observed frequency groups.

U_{bias}, V	U_{plasma}, V	d, mm	$f_o \cdot 10^6$, cycles	$f_1 \cdot 10^6$, cycles	$f_2 \cdot 10^6$, cycles	$f_3 \cdot 10^6$, cycles	$f_4 \cdot 10^6$, cycles	$f_5 \cdot 10^6$, cycles
120	16	2.0	125	—	—	490	595—660	710—790
140	14	2.2	135	—	—	550—560	630—720	760—860
160	12	2.4	145	—	—	540—600	660—765	820—900
180	11	2.8	152	—	—	570—630	630—795	870—920
200	11	3.0	158	—	460—485	580—660	710—835	—
220	11	3.2	164	—	470—510	620—680	760—860	—
240	10	3.5	169	310—345	460—535	640—710	795—870	—
260	10	3.7	173	330—360	490—540	660—740	820—920	—

Card 5/7

This mechanism is applicable for frequencies lower than the plasma frequency since because of fast damping of such alternating fields inside the plasma they remain concentrated on the surface of the plasma. The authors also show that the mean free path l of the electrons is of fundamental importance and must be at least equal to 2L. When l was adjusted to approximately 6 cm, oscillation vanished at L = 3 cm. Also, the authors investigated influences of plasma densities and widths of the excited frequency groups. They found that phase focusing plays a substantial role at high amplitudes of oscillations. They observed sometimes in the plasma of the primary discharge, oscillations caused by electron oscillations in the potential well of the cathode potential drops. All oscillations were accompanied by electromagnetic radiations discernible by antennas placed outside the discharge tube. The authors believe that the oscillations observed by Looney and Brown and, most probably, by other authors are connected to the

mechanism of amplitude selection. Ya. B. Faynberg evaluated many results of the present paper. There are 9 figures; 2 tables; and 11 references, 1 Soviet, 1 Dutch, 1 Irish, 1 U.K., 7 U.S. The 5 most recent U.K. and U.S. references are: D. Gabor, IRE Trans., AP-4, Nr 3, 526 (1956); T. K. Allen, R. A. Bayley, K. G. Emeleus, Brit. J. Appl. Phys., 6, 320 (1955); D. K. Looney, S. C. Brown, Phys. Rev., 93, 965 (1954); D. Bohm, E. P. Gross, Phys. Rev., 75, 1851, 1864 (1949); 79, 992 (1950).

SUBMITTED: November 2, 1959

9.3150,24.2120

77843
SOV/57-30-3-9/15

AUTHORS: Demirkhanov, R. A., Gevorkov, A. K., Popov, A. F.

TITLE: Interaction With Plasma of a Charged Particle Beam (Reported at the IV International Conference on Ionization Phenomena in Gases. Upsala (Sweden), August 1959)

PERIODICAL: Zhurnal tekhnicheskoy fiziki, 1960, Vol 30, Nr 3, pp 315-319 (USSR)

ABSTRACT: Investigation of ultrahigh-frequency plasma oscillations excited by a beam of fast electrons is important for understanding kinetic stability of plasmas, establishment of Maxwellian velocity distributions, radio wave emission by sun and stars, etc. Despite many reports, investigations cannot be considered concluded since many of the published results disagree. Theoretical works by Bohm and Gross (Phys. Rev., 75, 1851, 1864, 1949; 79, 992, 1951), A. I. Akhiyezer, Ya. B. Faynberg (ZhTF, 21, 1262, 1951), and Berz (see references at end of abstract) showed that whenever a plasma

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contains beams of charged particles of fixed velocities higher than the average thermal velocity of the plasma electrons, the system becomes unstable, and oscillations of frequency close to that of the plasma build up in amplitude. The present work investigated oscillations caused by a continuous electron beam injected into the plasma. One of the experimental set-ups is shown on Fig. 1. Oxide-coated cathode A and the anode B supplied the electron beam which is passing through a 2-4-mm circular opening through C into the basic plasma produced between the oxide-coated D and C. The current density of the beam was negligible compared with the density of the plasma. Oscillations were registered by antennas outside the tubes or by a probe inside the discharge region of another type of apparatus. The authors were able to register oscillations of 100-3,500 mc/s. Experiments were performed at 10^{-2}-10^{-3} mm Hg of pressure with Ar, H_2, and N_2. They observed plasma oscillations every time the electron beam crossed the

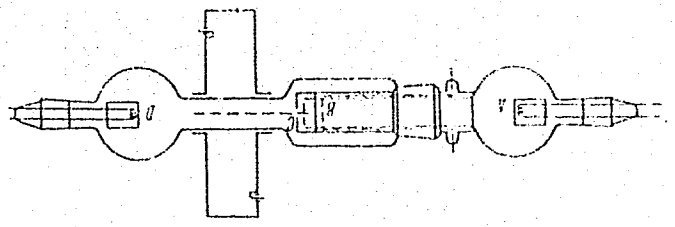


Fig. 1. Construction of the discharge tube.

plasma. The width of the excited spectrum was 500-600 mc with a maximum of intensity corresponding to the plasma frequency. The theoretical frequency is given by:

$$\omega_p^2 = \frac{4\pi N e^2}{m},$$

where ω_p is frequency corresponding to the maximum of intensity; N is density of electrons of the plasma;

e and m are charge and mass of the electron, respectively. It corresponds to curve 1 on Fig. 3.

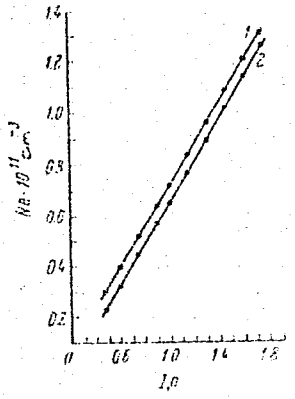
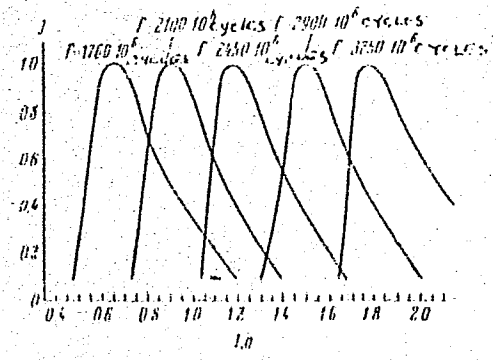


Fig. 3. Plasma density vs. discharge current: (1) plasma density computed using Equation ("A"); (2) density measured by the resonator method.

It differs from the experimental curve 2 probably because of a nonuniform distribution of plasma density over the discharge tube, leading to a lower resonator constant. The authors obtained a set of oscillation intensity versus density curves (Fig. 4) which agree well with theoretical predictions by Bohm and by Sumi (J. Phys. Soc. Japan, 13, 1476, 1958). The power of these longitudinal oscillations was of the order of a microwatt for a 1-2 ma beam current. Oscillations may be observed over the whole volume of the plasma, but the amplitude decreases very fast with the distance from the beam. The authors conclude that whenever a beam is injected having velocities V_1 larger than the thermal electron velocities V_T inside the plasma, the beam excites waves and the beam energy is converted into oscillation energy which may alter the relaxation time, change the diffusion, and produce emission of radio waves. Ya. B. Faynberg evaluated some results of

Fig. 4. Intensity variations for a given frequency vs. plasma density. Ordinate represents intensity for each curve, in relative units.



this work, and G. I. Zverev explained the methods for measuring ultrahigh frequencies. There are 4 figures; and 14 references, 2 Soviet, 1 Dutch, 1 Irish, 1 Japanese, 2 U.K., 7 U.S. The 5 recent U.K. and U.S. references are: G. D. Boyd,

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L 02995-67 EWT(m)/EWP(j)/EWP(t)/ETI IJP(c) JW/RM/GW/WW

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AUTHOR: Bezukh, Ye. P.; Zhigach, A. F.; Larikov, Ye. I.; Popov, A. F.

ORG: none

TITLE: Synthesis of methylaluminum sesquichloride and trimethylaluminum

SOURCE: Khimicheskaya promyshlennost', no. 10, 1966, 740-742

TOPIC TAGS: methylaluminum sesquioxide, trimethylaluminum, ~~one-step process~~, CHEMICAL synthesis, propellant, ALUMINUM COMPOUND, CHLORIDE

ABSTRACT: Direct one-step preparative methods for methylaluminum sesquichloride (a mixture of $Al(CH_3)_2Cl$ and $AlCH_3Cl_2$) and trimethylaluminum are described. Methylaluminum sesquichloride was synthesized in a sealed reactor (Popov, A. F. and N. N. Korneyev, Author Certificate 168691. 1962, Byul. izobr, no. 5, 1965) from iodine-activated PA-4 aluminum powder or ASD-T aluminum powder and methyl chloride in cyclohexane solution at a 2/3/4.65 constant initial molar ratio. The optimum preparative conditions were determined (see Table 1) to be 50—70C for 6—7 hr. The process was tested on a previously developed continuous reactor for ethylaluminum sesquioxide (Zhigach, A. F., A. F. Popov, and Ye. P. Bezukh Byulleten' tekhn.-ekonom. informatsii GOSINTI, v. 2, 1962, p. 39). Trimethylaluminum was synthesized as follows:
$2Al + 3Mg + 6CH_3Cl \rightarrow 2Al(CH_3)_3 + 3MgCl_2$ from AST-D aluminum powder PMF-4 magnesium

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Table. 1. Effect of temperature and reaction time on the methylaluminum sesquioxide yield and reaction rate

Reaction time	Temperature, °C	Composition of the reaction products, %		Overall yield of reactions based on Al, %	Average reaction rate, mol/g-atom-hr)
		$Al(CH_3)_2Cl$	$AlCH_3Cl_2$		
ASD-T aluminum powder					
20	30	51,2	48,7	15,9	0,004
20	50	54,2	45,8	66,5	0,0166
20	60	54,8	45,2	99,0	0,0247
20	70	54,8	45,1	99,1	0,0246
20	90	50,0	50,0	99,5	0,0248
20	110	46,0	54,0	95,0	0,0238
20	130	29,0	71,0	65,0	0,0163
20	140	10,0	90,0	45,0	0,0113
20	150	8,0	92,0	22,0	0,0055
2,5	55	48,0	52,0	39,2	0,078
5	55	48,9	51,1	76,5	0,066
6	55	50,4	49,6	97,3	0,081
10	55	50,0	50,0	99,0	0,046
15	55	50,5	49,5	98,1	0,033
20	55	49,8	50,2	98,0	0,024
PA-4 aluminum powder					
10	70	—	—	—	0
5	70	52,30	47,70	71,0	0,071
7	70	57,00	43,00	88,0	0,062
10	70	56,44	43,56	89,0	0,044

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and methyl chloride in cyclohexane solution at a constant 2/3/6/3 initial molar ratio. The optimum preparative conditions were determined (see Table 2) to be 120C for 5 hr.

Table 2. Effect of temperature on trimethylaluminum yield and reaction rate (Reaction time, 5 hr)

Temperature, °C	Composition of the reaction products		Overall yield of reaction products based on Al, %	Average reaction rate, mol/(g-atom-hr)
	$Al(CH_3)_3$	$Al(CH_3)_2Cl$		
100	68,6	31,4	83,2	0,167
105	67,8	32,2	86,5	0,173
120	72,7	27,3	97,5	0,195
130	69,5	30,5	85,0	0,170
150	65,8	34,2	47,3	0,095

The drop of $Al(CH_3)_3$ yield and reaction rate at higher temperatures was explained as its thermal decomposition catalyzed by titanium contaminating the aluminum. Orig. art. has: 2 tables.

SUB CODE: 07, 19/ SUBM DATE: none/ ORIG REF: 006/ OTH REF: 030/ ATD PRESS: 5099

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POPOV, A.F., inzhener.

Make fuller use of production potentials. Sel'khozmashina no.4: 26-29 Ap '57. (MLRA 10:4)
(Agricultural machinery industry)

POPOV, A.F., inzhener.

Specialization of production in the machinery industry.
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(Machinery industry)

POPOV, A.F., inzh.; CHUNIKHIN, K.T., inzh.; MEL'NIKOV, Ye.G., inzh.

Reinforced-concrete elements for farm buildings. Bet. i zhel.-bet. no.5:205-206 My '61. (MIRA 14:6)
(Reinforced concrete construction)
(Farm buildings)